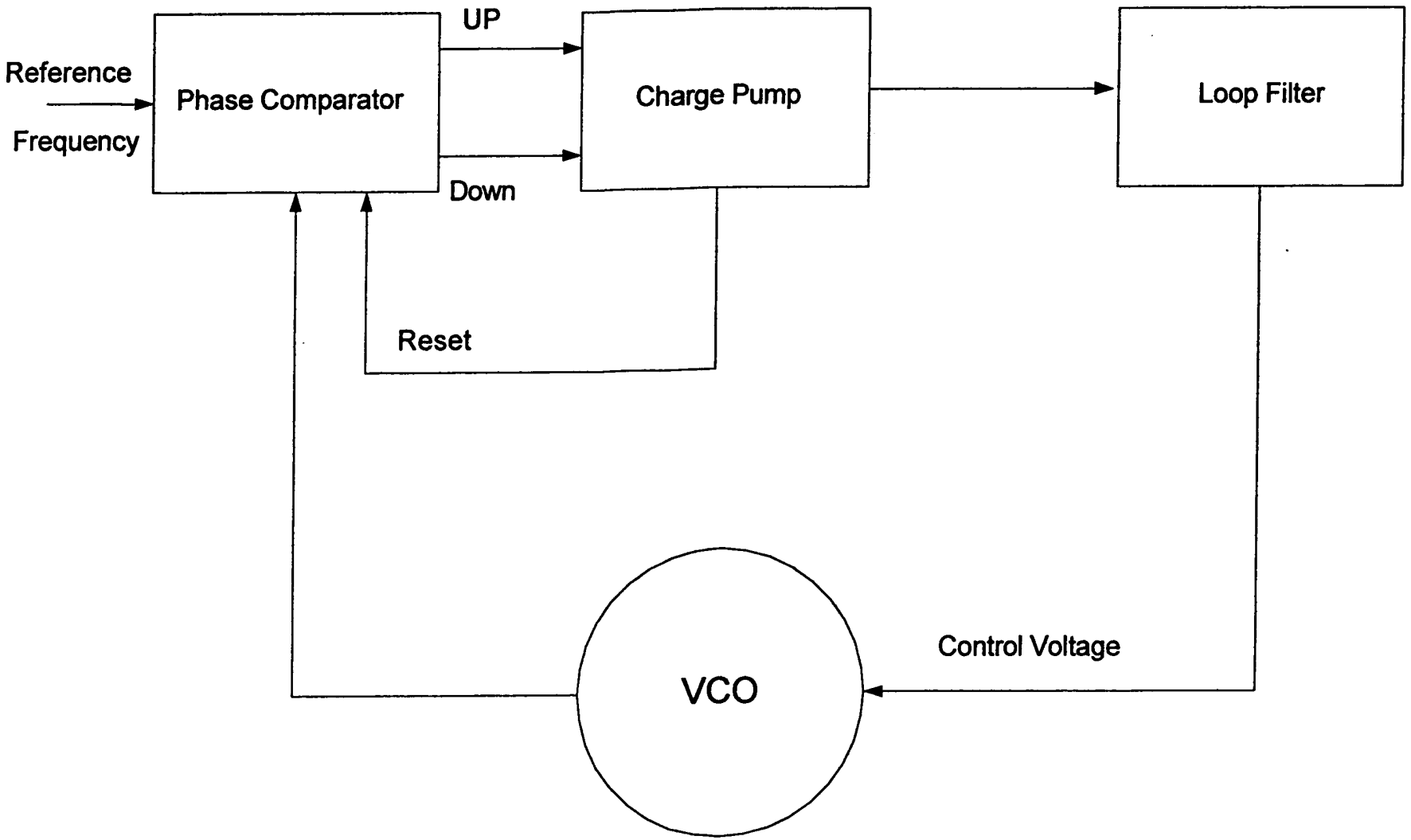

Figure 1. Prior Art

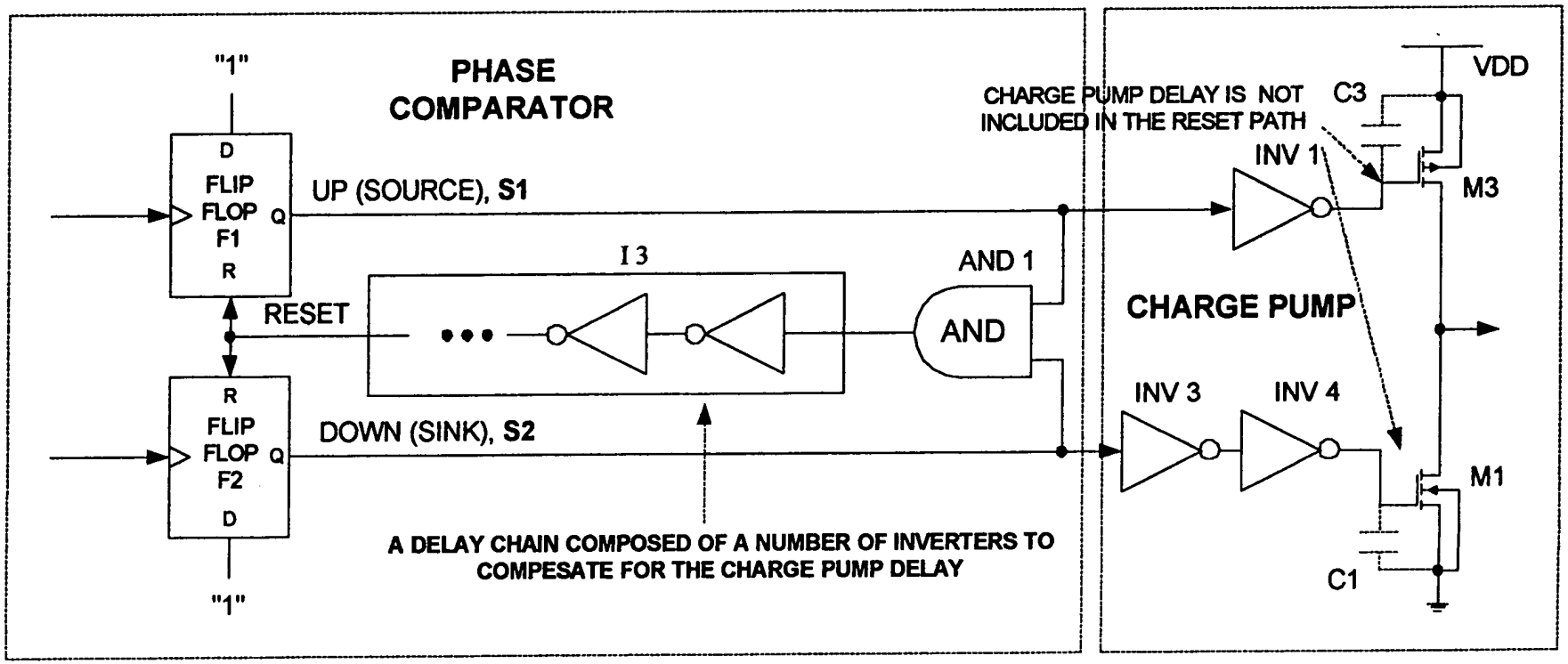

Figure 2. Prior Art

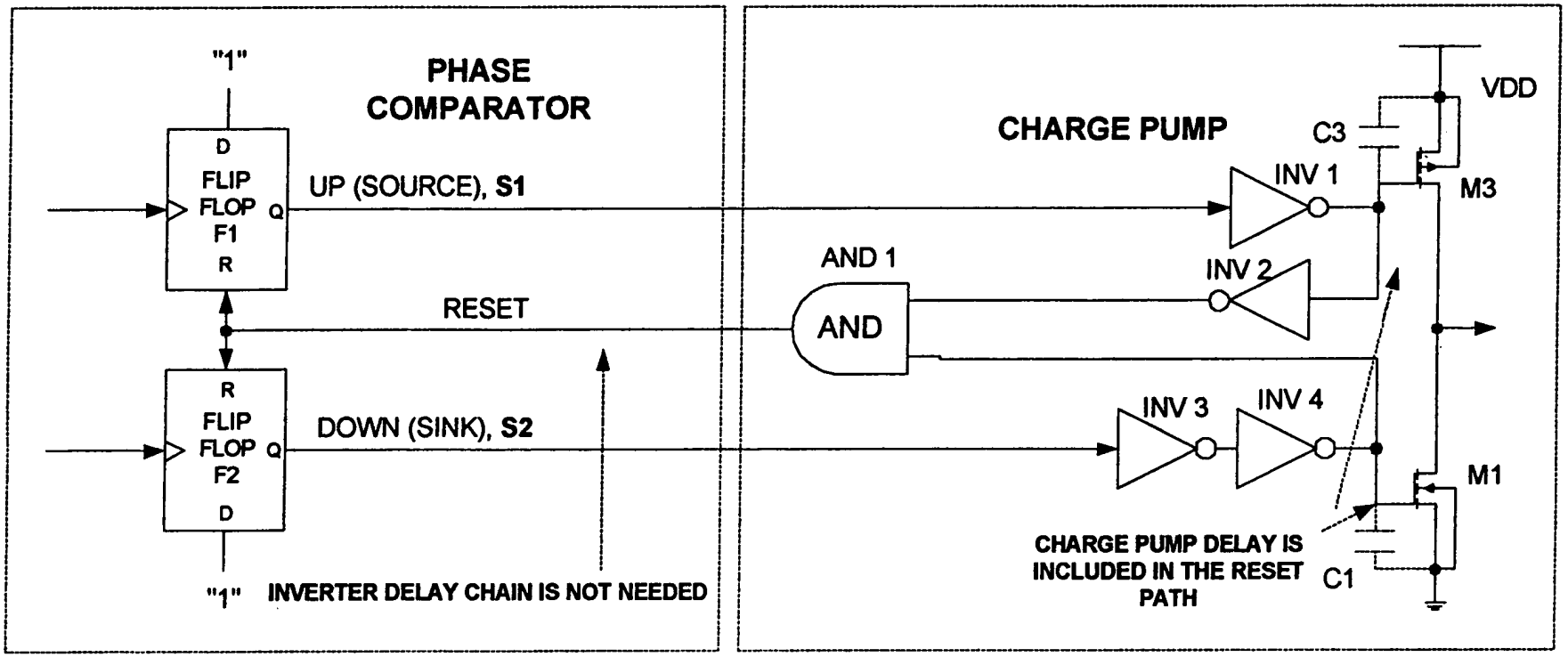
"1"
PHASE
COMPARATOR
D
FLIP
FLOP
F1
R
Q
UP (SOURCE), S1
RESET
R
FLIP
FLOP
F2
D
Q
DOWN (SINK), S2
"1"
INVERTER DELAY CHAIN IS NOT NEEDED
CHARGE PUMP
AND 1
AND
VDD
C3
INV 1
M3
INV 2
INV 3
INV 4
M1
C1
CHARGE PUMP DELAY IS
INCLUDED IN THE RESET
PATH

Figure 3.

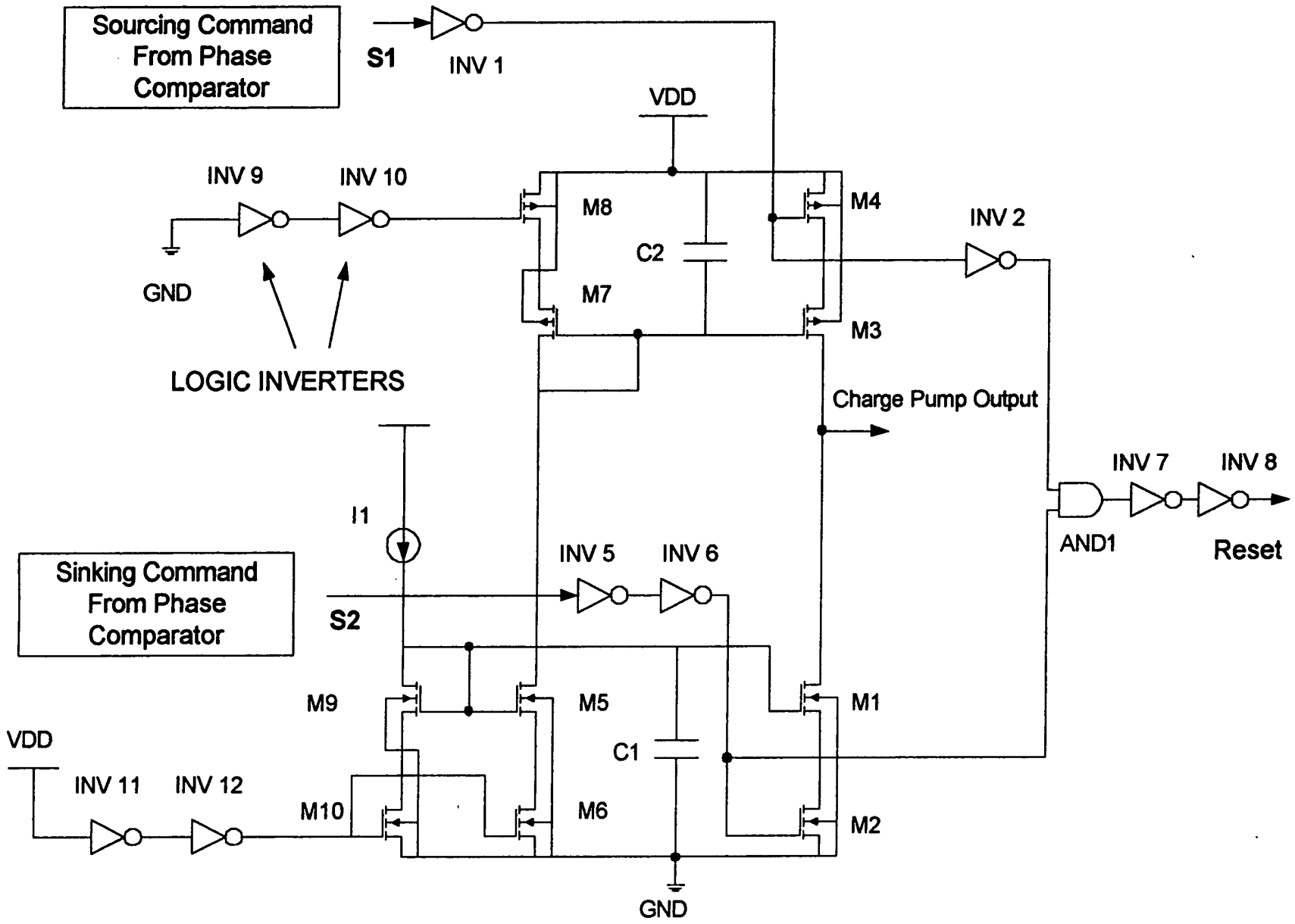
Sourcing Command From Phase Comparator
S1
INV 1
VDD
INV 9
INV 10
M8
M4
INV 2
C2
GND
M7
M3
LOGIC INVERTERS
Charge Pump Output
INV 7
INV 8
I1
AND1
Reset
Sinking Command From Phase Comparator
INV 5
INV 6
S2
M9
M5
M1
VDD
C1
INV 11
INV 12
M10
M6
M2
GND

Figure 4.

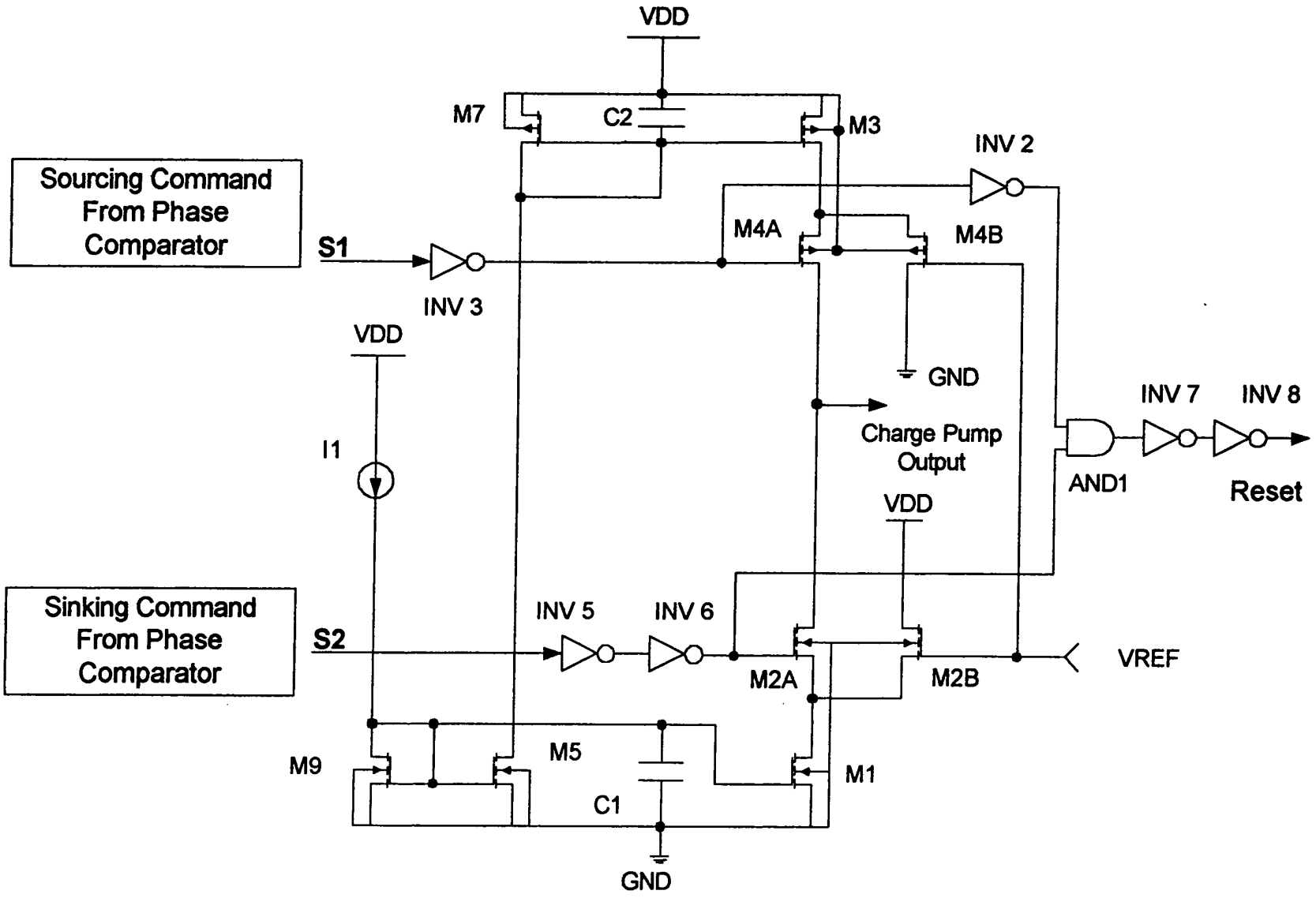
VDD
M7
C2
M3
INV 2
Sourcing Command From Phase Comparator
S1
M4A
M4B
INV 3
VDD
GND
INV 7
INV 8
Charge Pump Output
I1
AND1
Reset
VDD
Sinking Command From Phase Comparator
INV 5
INV 6
S2
VREF
M2A
M2B
M9
M5
M1
C1
GND

Figure 5.